

Claims

- [c1] 1. A pulse width modulator, adapted to receive a feedback voltage and a reference voltage, the pulse width modulator comprising:
- a amplitude-adjustable triangle-wave generator, adapted to perform an amplitude operation according to the reference voltage and the feedback voltage for generating an amplitude-adjustable triangle wave according to a variation of the feedback voltage;
 - an error signal generator, adapted to perform an error operation according to the feedback voltage and the reference voltage for outputting an error signal;
 - a pulse signal generator, coupled to the amplitude-adjustable triangle-wave generator and the error signal generator, adapted to receive and compare the error signal and the amplitude-adjustable triangle wave for outputting a pulse controlling signal; and
 - a driving circuit, coupled to the pulse signal generator, adapted to receive and transform the pulse generating signal for outputting a driving signal.
- [c2] 2. The pulse width modulator of claim 1, wherein when a difference between the feedback voltage and the refer-

ence voltage is higher than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a first amplitude of the amplitude-adjustable triangle wave.

- [c3] 3. The pulse width modulator of claim 1, wherein when a difference between the feedback voltage and the reference voltage is lower than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a progressive second amplitude of the amplitude-adjustable triangle wave.
- [c4] 4. The pulse width modulator of claim 1, wherein when the feedback voltage is higher than, or equal to, the reference voltage, the amplitude-adjustable triangle-wave generator outputs a third amplitude of the amplitude-adjustable triangle wave.
- [c5] 5. A loading system, coupled to a power terminal, the loading system comprising:
 - a boosting circuit having an input terminal, coupled to the power terminal for selectively receiving an operational voltage therefrom, and an output terminal;
 - a pulse width modulator, coupled to the output terminal of the boosting circuit, comprising:
 - an amplitude-adjustable triangle-wave generator, adapted to receive a feedback voltage from the boosting

circuit and to perform an amplitude operation according to a reference voltage and the feedback voltage for generating an amplitude-adjustable triangle wave according to a variation of the feedback voltage;

an error signal generator, adapted to perform an error operation according to the feedback voltage and the reference voltage for outputting an error signal;

a pulse signal generator, coupled to the amplitude-adjustable triangle-wave generator and the error signal generator, adapted to receive and compare the error signal and the amplitude-adjustable triangle wave for outputting a pulse controlling signal;

a driving circuit, coupled to the pulse signal generator, adapted to receive and transform the pulse generating signal for outputting a driving signal; and

a switch having a first terminal, coupled to the driving circuit, a second terminal coupled to the power terminal, and a third terminal coupled to a ground terminal, the turning on or turning off of the switch depends on the driving signal.

- [c6] 6. The loading system of claim 5, wherein when the switch is turned off, the power terminal applies the operational voltage to the boosting circuit; when the switch is turned on, the power terminal does not apply the operational voltage to the boosting circuit.

- [c7] 7. The loading system of claim 5, wherein when a difference between the feedback voltage and the reference voltage is higher than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a first amplitude of the amplitude-adjustable triangle wave.
- [c8] 8. The loading system of claim 5, wherein when a difference between the feedback voltage and the reference voltage is lower than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a progressive second amplitude of the amplitude-adjustable triangle wave.
- [c9] 9. The loading system of claim 5, wherein when the feedback voltage is higher than, or equal to, the reference voltage, the amplitude-adjustable triangle-wave generator outputs a third amplitude of the amplitude-adjustable triangle wave.
- [c10] 10. A loading system, coupled to a power terminal, the loading system comprising:
 - a buck circuit, having an input terminal coupled to the power terminal for selectively receiving an operational voltage therefrom, and an output terminal;
 - a pulse width modulator, coupled to the output terminal of the buck circuit, comprising:

a amplitude-adjustable triangle-wave generator, adapted to receive a feedback voltage from the buck circuit and to perform an amplitude operation according to a reference voltage and the feedback voltage for generating an amplitude-adjustable triangle wave according to a variation of the feedback voltage;

an error signal generator, adapted to perform an error operation according to the feedback voltage and the reference voltage for outputting an error signal;

a pulse signal generator, coupled to the amplitude-adjustable triangle-wave generator and the error signal generator, adapted to receive and compare the error signal and the amplitude-adjustable triangle wave for outputting a pulse controlling signal;

a driving circuit, coupled to the pulse signal generator, adapted to receive and transform the pulse generating signal for outputting a driving signal; and

a switch, having a first terminal coupled to the driving circuit, a second terminal coupled to the power terminal, and a third terminal coupled to a ground terminal, the turning on or turning off of the switch depends on the driving signal.

- [c11] 11. The loading system of claim 10, wherein when the switch is turned off, the power terminal applies the operational voltage to the boosting buck circuit; when the

switch is turned on, the power terminal does not apply the operational voltage to the boosting buck circuit.

- [c12] 12. The loading system of claim 10, wherein when a difference between the feedback voltage and the reference voltage is higher than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a first amplitude of the amplitude-adjustable triangle wave.
- [c13] 13. The loading system of claim 10, wherein when a difference between the feedback voltage and the reference voltage is lower than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a progressive second amplitude of the amplitude-adjustable triangle wave.
- [c14] 14. The loading system of claim 10, wherein when the feedback voltage is higher than, or equal to, the reference voltage, the amplitude-adjustable triangle-wave generator outputs a third amplitude of the amplitude-adjustable triangle wave.
- [c15] 15. A loading system coupled to a power terminal, the loading system comprising:
 - a push-pull circuit, having an input and an output terminal, the output terminal outputting a feedback voltage;
 - a pulse width modulator, coupled to the output terminal

of the push-pull circuit, comprising:

- a amplitude-adjustable triangle-wave generator, adapted to receive the feedback voltage from the push-pull circuit and to perform an amplitude operation according to a reference voltage and the feedback voltage for generating an amplitude-adjustable triangle wave according to a variation of the feedback voltage;
- an error signal generator, adapted to perform an error operation according to the feedback voltage and the reference voltage for outputting an error signal;
- a pulse signal generator, coupled to the amplitude-adjustable triangle-wave generator and the error signal generator, adapted to receive and compare the error signal and the amplitude-adjustable triangle wave for outputting a pulse controlling signal;
- a driving circuit, coupled to the pulse signal generator, adapted to receive and transform the pulse generating signal for outputting a driving signal; and
- a switch, having a first terminal coupled to the driving circuit, a second terminal coupled to the power terminal, and a third terminal coupled to a ground terminal, the turning on or turning off of the switch depends on the driving signal.

- [c16] 16. The loading system of claim 15, wherein the push-pull circuit generates an induced current when the switch

is turned on.

- [c17] 17. The loading system of claim 15, wherein when a difference between the feedback voltage and the reference voltage is higher than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a first amplitude of the amplitude-adjustable triangle wave.
- [c18] 18. The loading system of claim 15, wherein when a difference between the feedback voltage and the reference voltage is lower than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a progressive second amplitude of the amplitude-adjustable triangle wave.
- [c19] 19. The loading system of claim 15, wherein when the feedback voltage is higher than, or equal to, the reference voltage, the amplitude-adjustable triangle-wave generator outputs a third amplitude of the amplitude-adjustable triangle wave.
- [c20] 20. A loading system coupled to a power terminal, the loading system comprising:
 - a full-bridge circuit, having an input and an output terminal, the output terminal outputting a feedback voltage;
 - a pulse width modulator, coupled to the output terminal

of the full-bridge circuit, comprising:

- a amplitude-adjustable triangle-wave generator, adapted to receive the feedback voltage from the full-bridge circuit and to perform an amplitude operation according to a reference voltage and the feedback voltage for generating an amplitude-adjustable triangle wave according to a variation of the feedback voltage;
- an error signal generator, adapted to perform an error operation according to the feedback voltage and the reference voltage for outputting an error signal;
- a pulse signal generator, coupled to the amplitude-adjustable triangle-wave generator and the error signal generator, adapted to receive and compare the error signal and the amplitude-adjustable triangle wave for outputting a pulse controlling signal;
- a driving circuit, coupled to the pulse signal generator, adapted to receive and transform the pulse generating signal for outputting a driving signal; and
- a switch, having a first terminal coupled to the driving circuit, a second terminal coupled to the power terminal, and a third terminal coupled to a ground terminal, the turning on or turning off of the switch depends on the driving signal.

- [c21] 21. The loading system of claim 20, wherein the full-bridge circuit generates an induced current when the

switch is turned on.

- [c22] 22. The loading system of claim 20, wherein when a difference between the feedback voltage and the reference voltage is higher than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a first amplitude of the amplitude-adjustable triangle wave.
- [c23] 23. The loading system of claim 20, wherein when a difference between the feedback voltage and the reference voltage is lower than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a progressive second amplitude of the amplitude-adjustable triangle wave.
- [c24] 24. The loading system of claim 20, wherein when the feedback voltage is higher than, or equal to, the reference voltage, the amplitude-adjustable triangle-wave generator outputs a third amplitude of the amplitude-adjustable triangle wave.
- [c25] 25. A loading system coupled to a power terminal, the loading system comprising:
 - a half-bridge circuit, having an input and an output terminal, the output terminal outputting a feedback voltage;
 - a pulse width modulator, coupled to the output terminal

of the half-bridge circuit, comprising:

- a amplitude-adjustable triangle-wave generator, adapted to receive the feedback voltage from the half-bridge circuit and to perform an amplitude operation according to a reference voltage and the feedback voltage for generating an amplitude-adjustable triangle wave according to a variation of the feedback voltage;
- an error signal generator, adapted to perform an error operation according to the feedback voltage and the reference voltage for outputting an error signal;
- a pulse signal generator, coupled to the amplitude-adjustable triangle-wave generator and the error signal generator, adapted to receive and compare the error signal and the amplitude-adjustable triangle wave for outputting a pulse controlling signal;
- a driving circuit, coupled to the pulse signal generator, adapted to receive and transform the pulse generating signal for outputting a driving signal; and
- a switch, having a first terminal coupled to the driving circuit, a second terminal coupled to the power terminal, and a third terminal coupled to a ground terminal, the turning on or turning off of the switch depends on the driving signal.

- [c26] 26. The loading system of claim 25, wherein the full-bridge circuit generates an induced current when the

switch is turned on.

- [c27] 27. The loading system of claim 25, wherein when a difference between the feedback voltage and the reference voltage is higher than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a first amplitude of the amplitude-adjustable triangle wave.
- [c28] 28. The loading system of claim 25, wherein when a difference between the feedback voltage and the reference voltage is lower than a transient voltage, the amplitude-adjustable triangle-wave generator outputs a progressive second amplitude of the amplitude-adjustable triangle wave.
- [c29] 29. The loading system of claim 25, wherein when the feedback voltage is higher than, or equal to, the reference voltage, the amplitude-adjustable triangle-wave generator outputs a third amplitude of the amplitude-adjustable triangle wave.